



Ningaloo Eclipse 2023

RECIPE DOC

DAYLIGHT DARKNESS, MADE WITH LOVE

MANASVEE SARAF

ASH VADOLIA

What is the dish?

THE TOTAL SOLAR ECLIPSE

For this dish, we need to achieve totality – the point in our sightline at which the Sun is totally covered by the Moon.

During totality we can see the Sun's atmosphere.



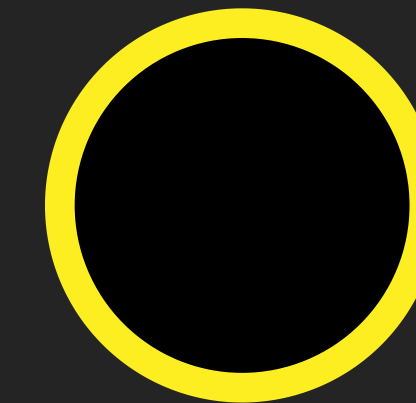
Warning: Variations in the preparation can lead to different results.



PARTIAL ECLIPSE

35.3%

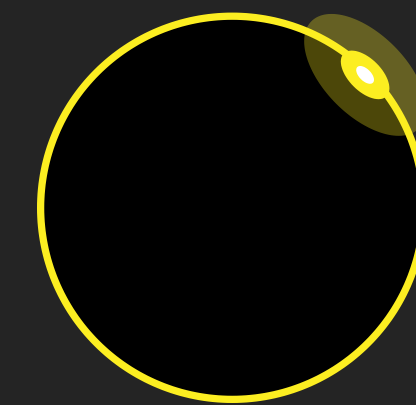
SUCCESS RATE



ANNULAR ECLIPSE

33.2%

SUCCESS RATE



TOTAL ECLIPSE

26.7%

SUCCESS RATE

THE LAST 4.8% 'HYBRID' ECLIPSES VARY FROM TOTAL TO ANNULAR DEPENDING ON THE CURVATURE OF THE EARTH

PREPARATION TIME:

2.3 YEARS

Time since the previous total solar eclipse

COOKING TIME:

1.5 YEARS

Average time between total solar eclipses

TIME TO CONSUME:

7.5 MINUTES

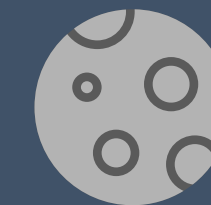
Maximum duration of totality

Ingredients

SUN



MOON



EARTH



SHADOW



TIME



YOU



WEATHER

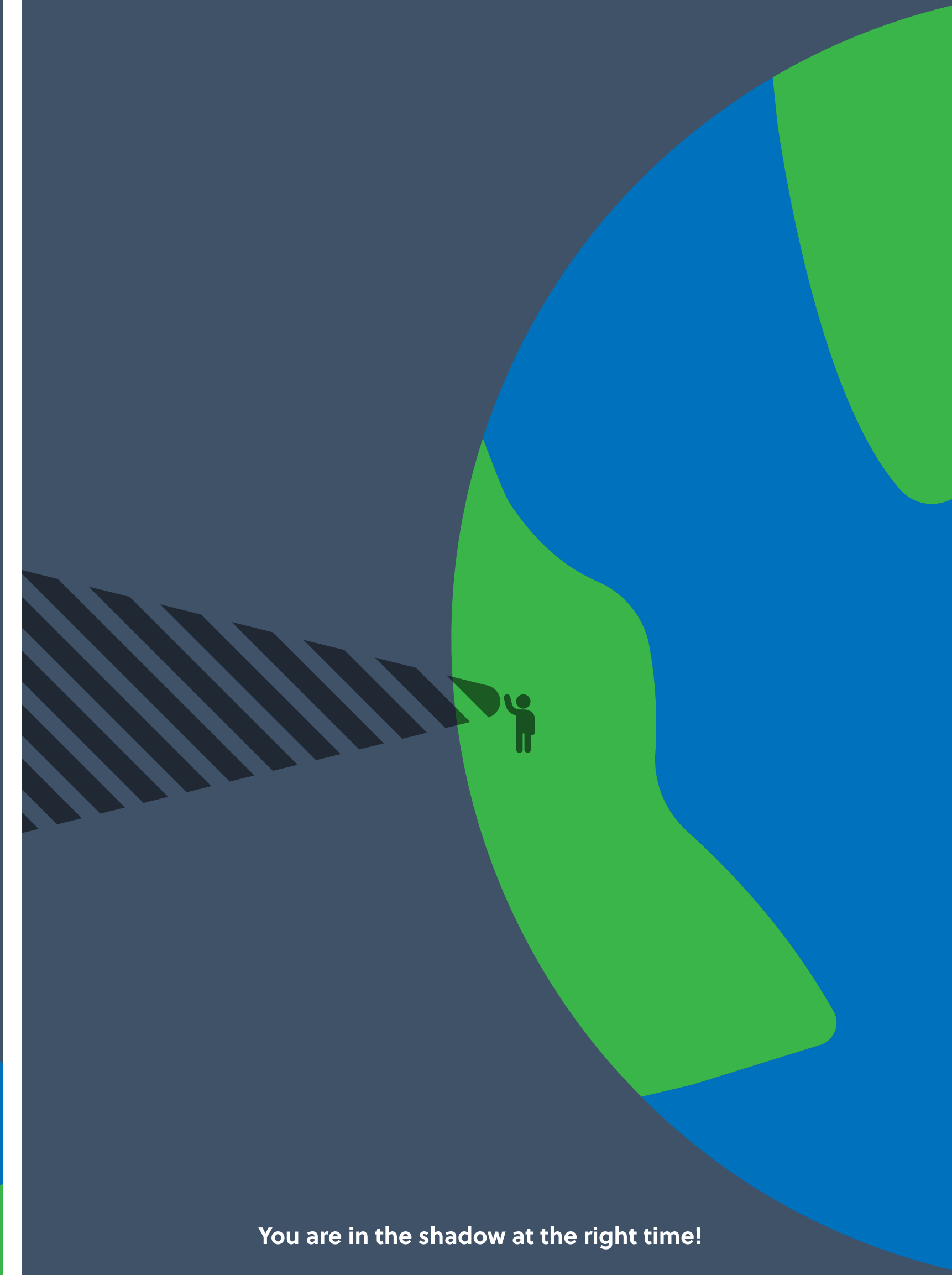
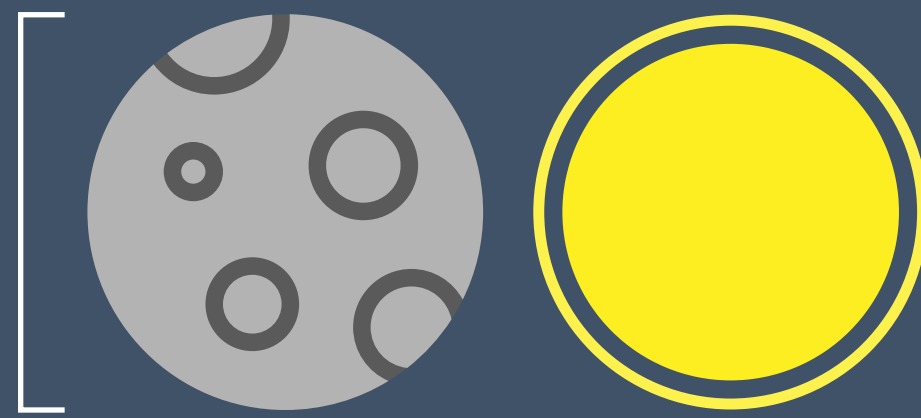


Key Factors



The Moon is in between and the Sun and the Earth

The Moon is the right size



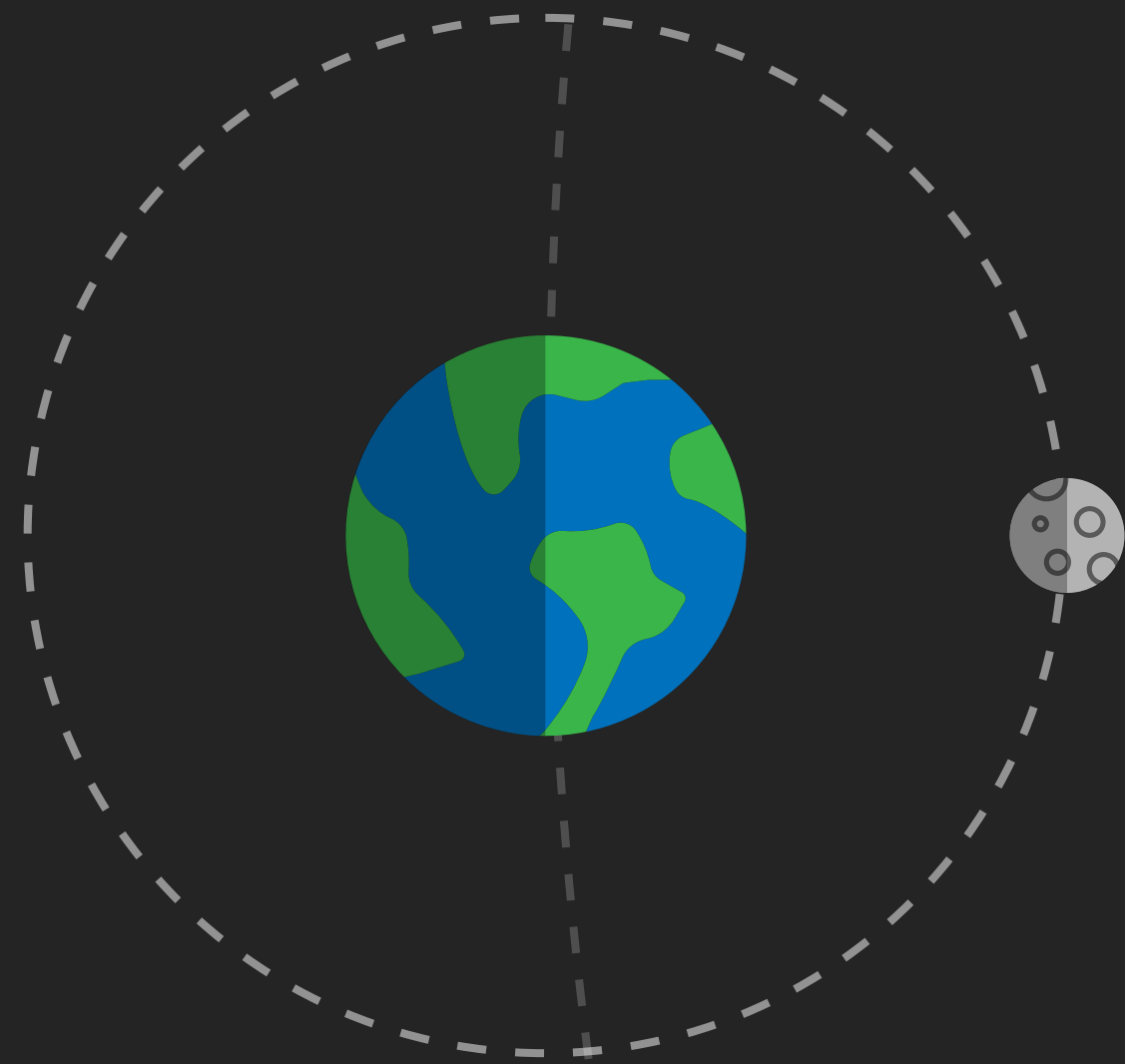
You are in the shadow at the right time!

Method

1. New Moon

Positioning the Sun, the Moon and the Earth in the correct order

PREPARATION TIME: 29.5 DAYS



**The Moon orbits
the Earth**

The Moon orbits the Earth every 29.5 days whilst the Earth orbits the Sun every 365.25 days

For a solar eclipse we need the moon to be positioned between the Sun and the Earth during these orbital motions.



2. Syzygy

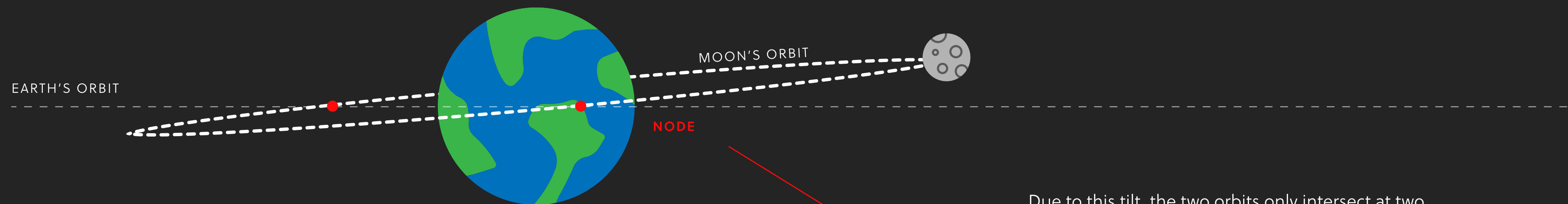
Aligning of the Sun, the Moon and the Earth in the same plane

PREPARATION TIME: APPROX. 6 MONTHS

Syzygy is only achieved on specific new moons!

The Earth's orbit and the Moon's orbit are on different planes tilted by:

5.1°



Due to this tilt, the two orbits only intersect at two points called nodes.

The correct node results in syzygy and a new moon.

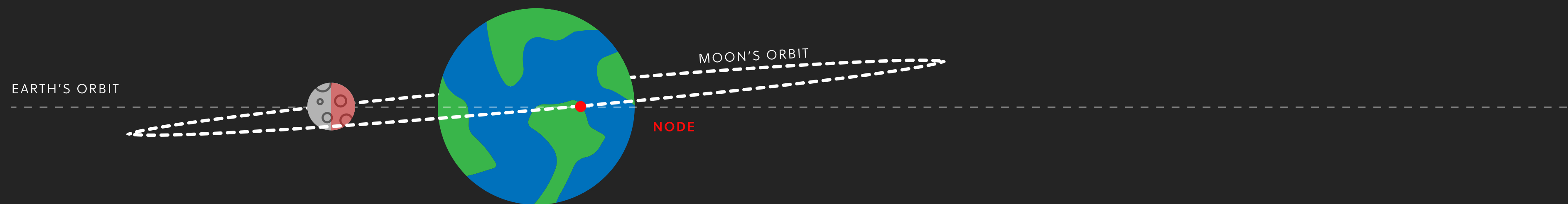
The Moon is at this correct node twice a year.

Warning: if you are not at this node, your solar eclipse recipe can turn out to look like the moon took a bite off the sun - that is only the partial solar eclipse!

At the other node, we have syzygy, but the Earth is in-between the Moon and the Sun.

This results in a lunar eclipse as the Earth casts a shadow on the Moon.

At this other node, the Moon appears red.



So as a cook: You must carefully time the movements of your ingredients — the Sun, the Moon, and the Earth to ensure the correct node is achieved.

3. Moon Size

Positioning of the Moon relative to the Earth

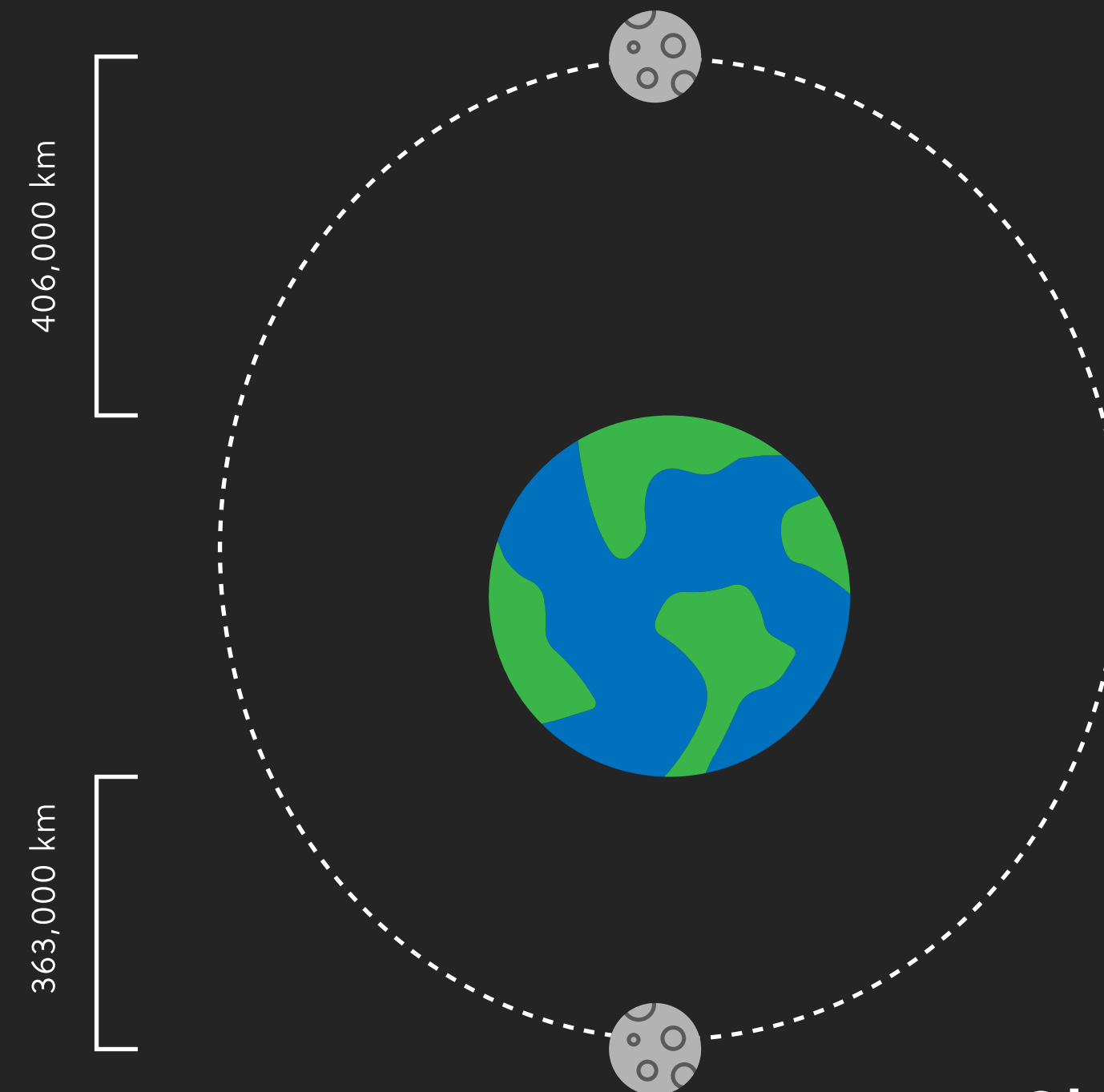
PREPARATION TIME: APPROX. 18 MONTHS



The Moon is orbiting the Earth

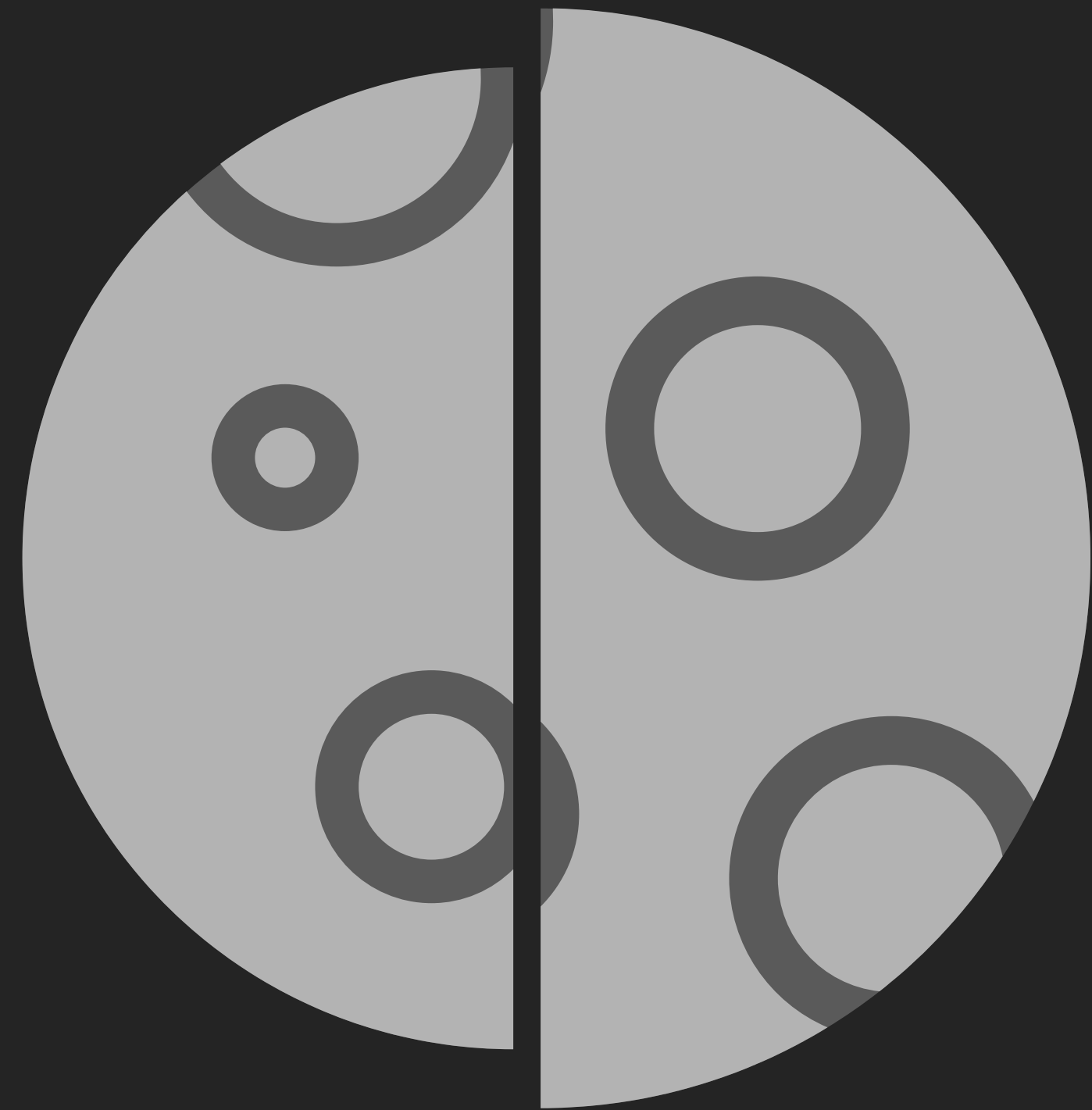
But its path around the Earth is not circular
– we call this an elliptical orbit

This means at different points in this path the Moon is either further away from us where it appears smaller or closer to us where it appears bigger!



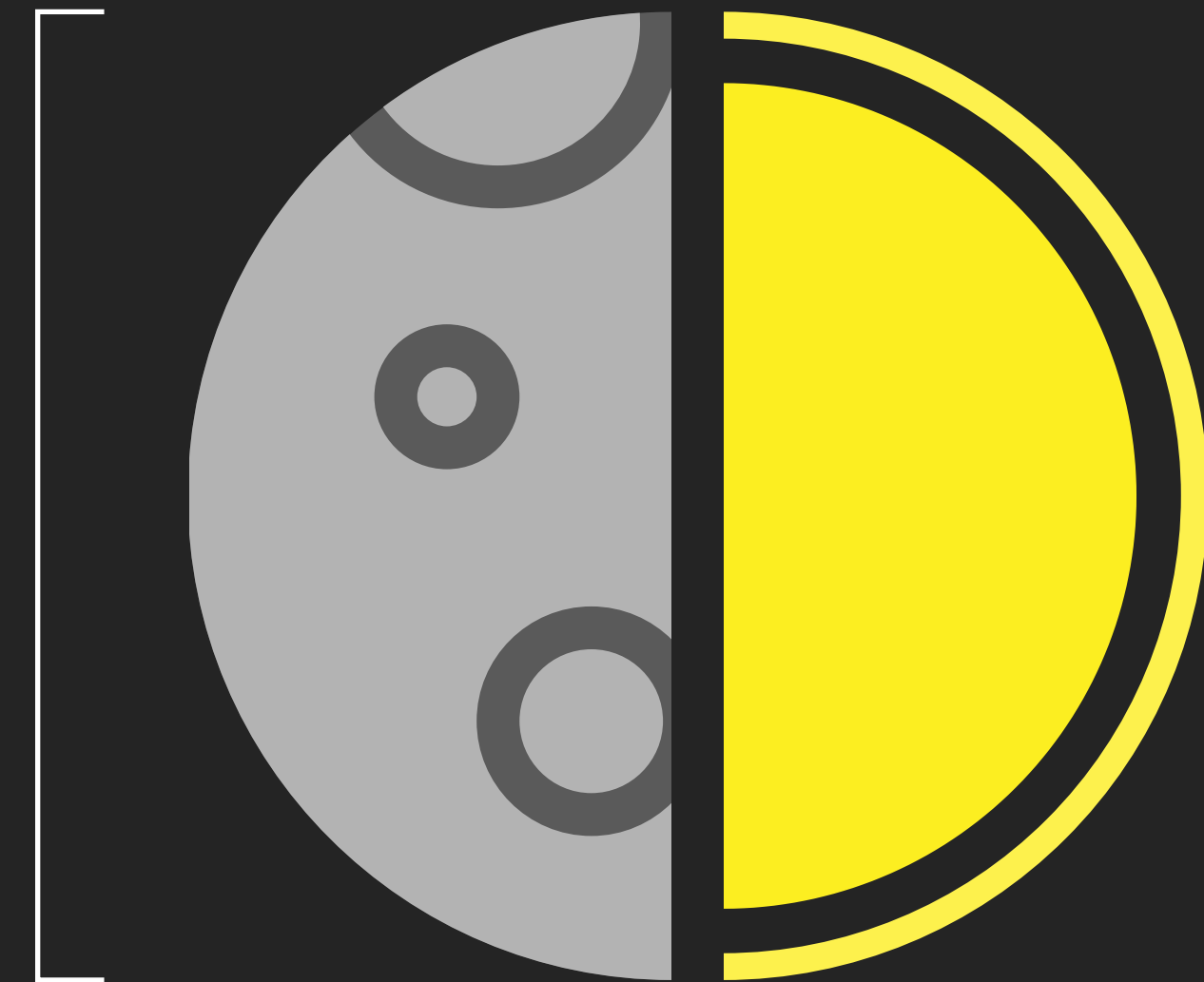
Objects that are closer to us appear bigger!

In one month, the Moon's size appears to vary up to:



14%

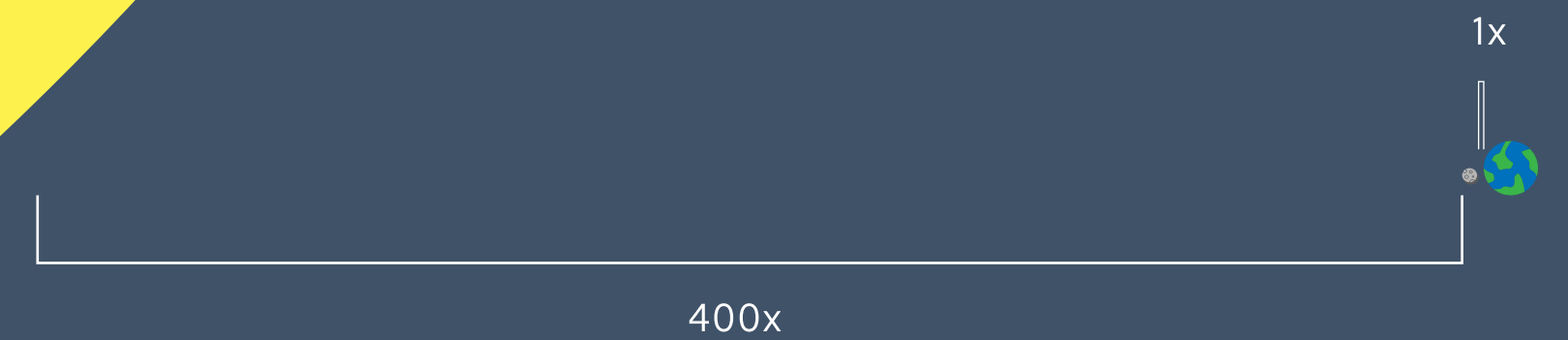
We need the Moon to be the exact size of the Sun to cover it perfectly.



Warning: if the sizes do not match, then your solar eclipse recipe can turn out to look like the Moon has a ring around it – that is only an annular eclipse!

But how is it possible for the Moon and the Sun to be the same size?

The Moon is about **400 times** smaller than the Sun!



*Objects are shown to scale

But the Sun is also about **400x** farther than the Moon.
So, for us on Earth, the Moon and the Sun can appear to be the same size!

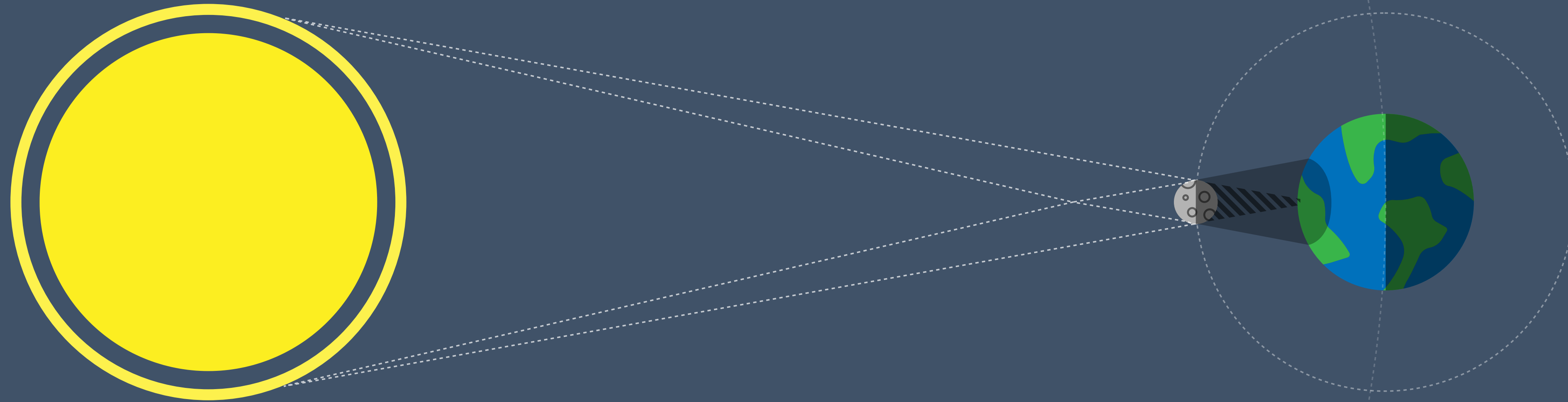
Objects that are farther appear smaller!

4. Chasing the Shadow

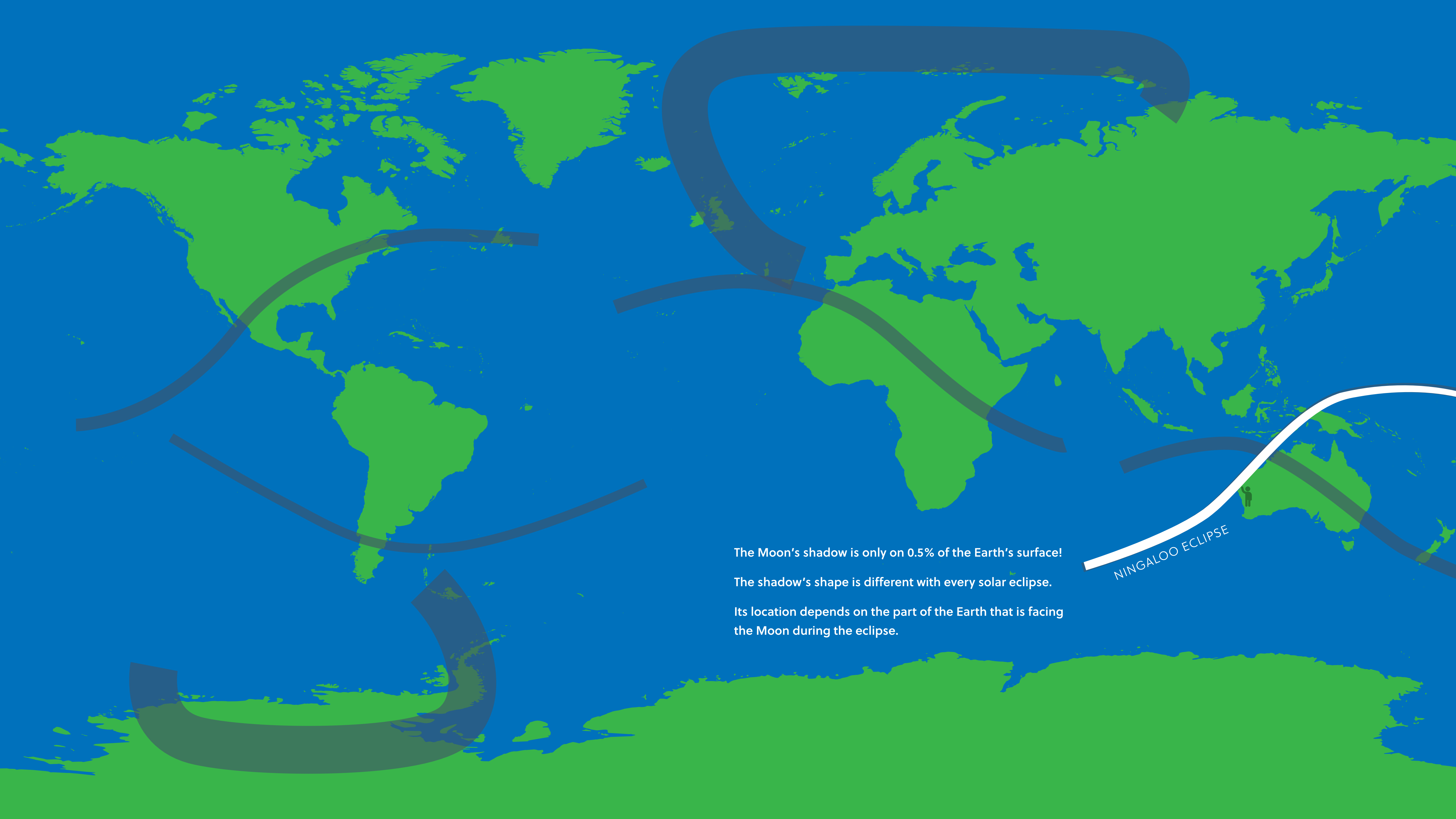
Positioning yourself at the right place, at the right time

PREPARATION TIME: 24 MONTHS

When the ingredients – the Sun, the Moon and the Earth – are all prepared, we need to take care of the shadow, time, and you!



The Sun casts the Moon's shadow on the Earth's surface.
In this shadow is where you can see the total solar eclipse.



The Moon's shadow is only on 0.5% of the Earth's surface!

The shadow's shape is different with every solar eclipse.

Its location depends on the part of the Earth that is facing the Moon during the eclipse.

NINGALOO ECLIPSE

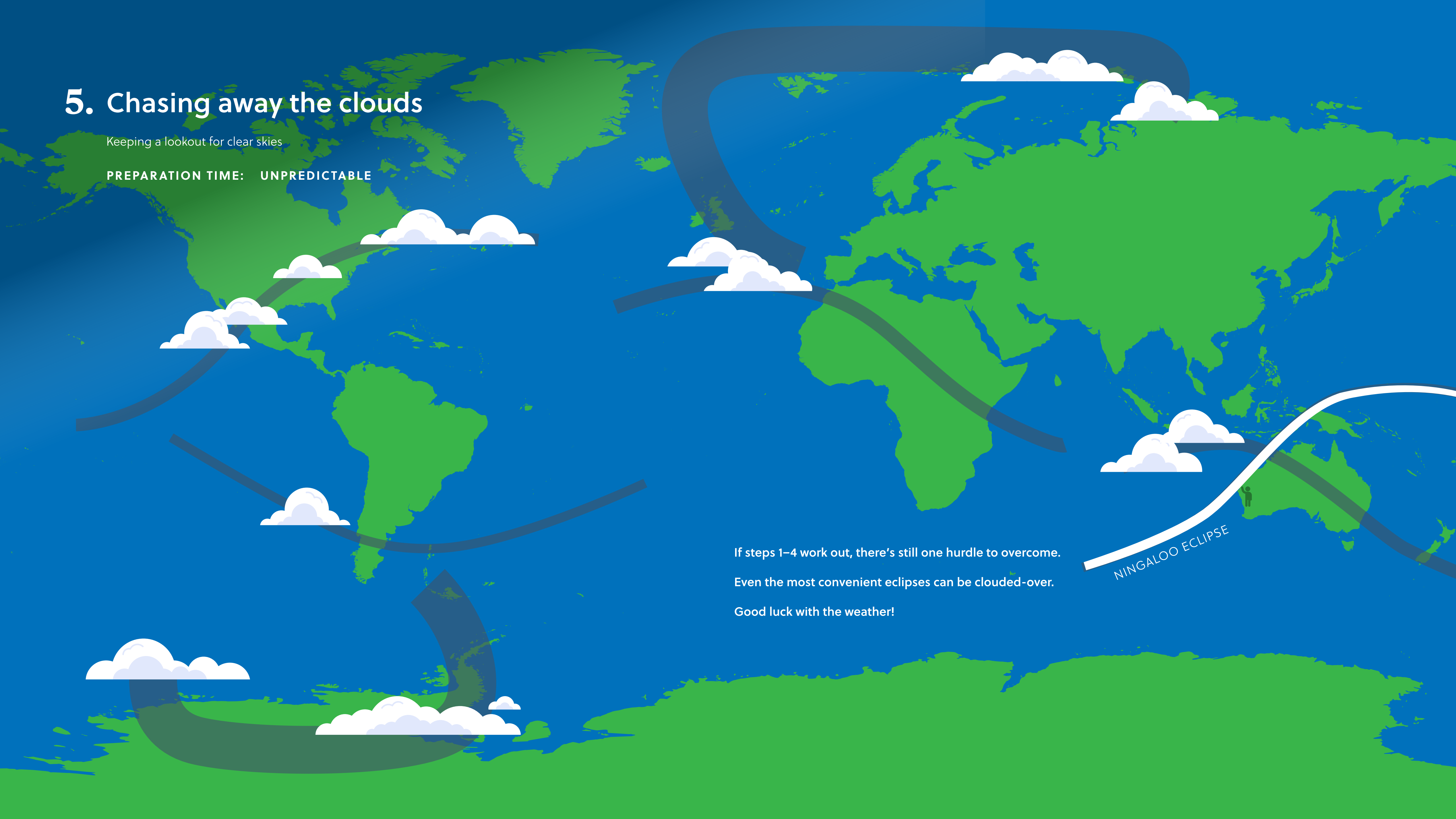
5. Chasing away the clouds

Keeping a lookout for clear skies

PREPARATION TIME: UNPREDICTABLE

If steps 1-4 work out, there's still one hurdle to overcome.
Even the most convenient eclipses can be clouded-over.
Good luck with the weather!

NINGALOO ECLIPSE



The previous total solar eclipse was on

4 December, 2021
IN ORCADAS, ANTARCTICA

The next one will be on

20 April, 2023
IN EXMOUTH, AUSTRALIA

The next one after that will be on

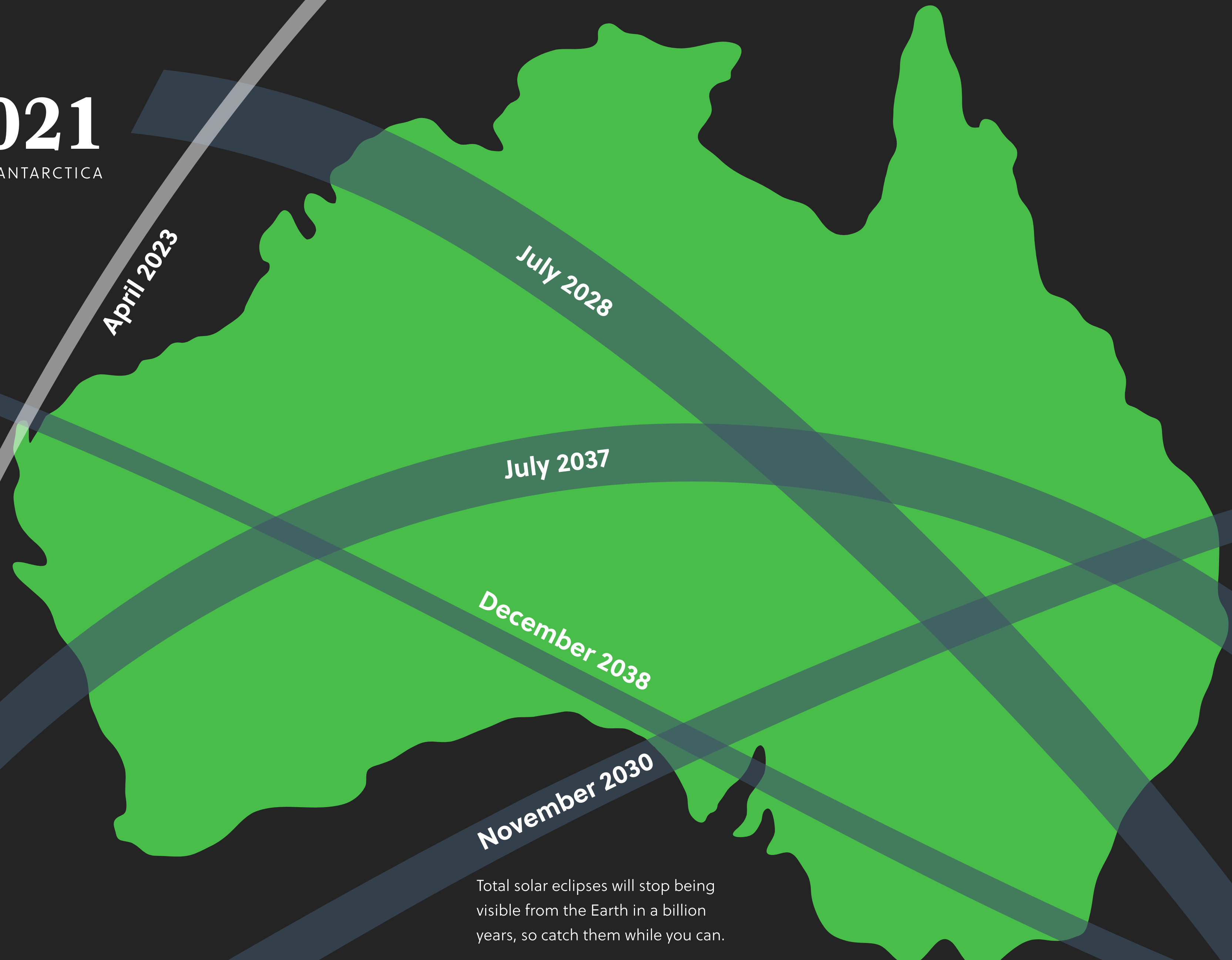
8 April, 2024
ACROSS MEXICO, USA, CANADA

The next one in Australia will be on

22 July, 2028

The next one in Exmouth will be in

375 Years



Total solar eclipses will stop being visible from the Earth in a billion years, so catch them while you can.

How to enjoy the dish

THE NINGALOO TOTAL SOLAR ECLIPSE 2023

Consume in just about one minute because the ingredients do not stay in their position for long.

The shadow width:

40 km

The shadow speed:

40 km per minute

TOTALITY

Time to consume this experience

60 seconds

For safety, this dish must be consumed with proper equipment.

Viewing the Sun directly during an eclipse can burn your retinas and can cause permanent damage to your eyesight.

The safe way of observing includes either projecting the light from the Sun onto another surface or filtering it with reputable eclipse glasses or solar filters.

More safety information can be found on the Astronomical Society of Australia website:



This document has been a joint effort from Manasvee Saraf and Ash Vadolia